What is claimed is:

1. A method for patterning a platinum layer in the fabrication of integrated circuits, the method comprising:

providing a substrate assembly including a surface in a reaction chamber;

forming a patterned metal-containing adhesion layer on the surface, resulting in at least one exposed surface region of the substrate assembly;

forming platinum on the patterned metal-containing adhesion layer and the at least one exposed surface region of the substrate assembly;

annealing the substrate assembly including the patterned metal-containing adhesion layer and the platinum thereon; and

removing platinum from the at least one exposed surface region of the substrate assembly.

2. The method of claim 1, wherein forming the platinum comprises forming a platinum layer having thickness of about 600 Å or less.

3. The method of claim 2, wherein forming the platinum comprises forming a platinum layer having a thickness of about 500 Å or less.

4. The method of claim 1, wherein annealing the substrate assembly is at a temperature less than the melting point of the at least one exposed surface region.

5. The method of claim 4, wherein annealing the substrate assembly comprises exposing the substrate assembly to a temperature less than the melting point of the at least one surface region for a time period sufficient to cause pooling of the platinum on the insulating portion of the at least one surface region.

6. The method of claim 5, wherein the temperature is between about 650°C and about 1100°C.

7. The method of claim 5, wherein the period of time is between about 5 seconds and about 5 minutes.

8. The method of claim 7, wherein the annealing occurs in an atmosphere comprising a compound selected from the group consisting of oxygen, ozone, nitrogen, argon, NO_x, SO_3, N_2O, and a combination thereof.

9. The method of claim 1 wherein annealing the substrate assembly is selected from the group consisting of an RTO anneal or an RTN anneal.

10. The method of claim 1, wherein the patterned metal-containing adhesion layer comprises a material selected from the group consisting of titanium, tantalum, tungsten, rhodium, iridium, cobalt, and nitrides, oxides, and silicides thereof.

11. The method of claim 1 wherein the patterned metal-containing adhesion layer comprises titanium nitride.

12. The method of claim 1, wherein the at least one exposed surface region comprises a material selected from the group consisting of silicon, silicon dioxide, BPSG, PSG, Al_2O_3, and a combination thereof.

13. A method for forming a discontinuous conductive layer in the fabrication of integrated circuits, the method comprising:

providing a substrate assembly in a reaction chamber, the substrate assembly having a surface including at least one metal-containing adhesion region separated by at least one surface region of the substrate assembly;

forming a platinum layer on the surface of the substrate assembly;

annealing the substrate assembly including the platinum layer thereon; and

removing platinum from the at least one exposed surface region to form a discontinuous platinum layer on at least one metal-containing adhesion region.

14. The method of claim 13, wherein forming the platinum comprises forming a platinum layer having thickness of about 600 Å or less.

15. The method of claim 14, wherein forming the platinum comprises forming a platinum layer having a thickness of about 500 Å or less.

16. The method of claim 13, wherein annealing the substrate assembly is at a temperature less than the melting point of the at least one exposed surface region.

17. The method of claim 16, wherein annealing the substrate assembly comprises exposing the substrate assembly to a temperature less than the melting point of the at least one surface region for a time period sufficient to cause pooling of the platinum on the insulating portion of the at least one surface region.

18. The method of claim 17, wherein the temperature is between about 650°C and about 1100°C.

19. The method of claim 17, wherein the period of time is between 5 seconds and about 5 minutes.

20. The method of claim 19, wherein the annealing occurs in an atmosphere comprising a compound selected from the group consisting of oxygen, ozone, nitrogen, argon, NO_x, SO_3, N_2O, and a combination thereof.

21. The method of claim 13 wherein annealing the substrate assembly is selected from the group consisting of an RTO anneal or an RTN anneal.

22. The method of claim 13, wherein the at least one metal-containing adhesion region comprises a material selected from the group consisting of titanium, tantalum, tungsten, rhodium, iridium, cobalt, and nitrides, oxides, and silicides thereof.

23. The method of claim 13 wherein the at least one metal-containing adhesion region comprises titanium nitride.

24. The method of claim 13, wherein the at least one exposed surface region comprises a material selected from the group consisting of silicon, silicon dioxide, BPSG, PSG, Al_2O_3, and a combination thereof.

25. A method for forming a platinum layer in the fabrication of integrated circuits, the method comprising:

providing a substrate assembly in a reaction chamber, the substrate assembly including a surface having a patterned metal-containing adhesion portion thereon;

depositing a platinum layer on the surface of the substrate assembly and the patterned metal-containing adhesion portion thereon, wherein the platinum layer has a thickness of about 600 Å or less;

annealing the substrate assembly at a temperature of about 1100°C or less; and

removing unadhered platinum from the surface of the substrate assembly such that a resulting patterned platinum layer has a configuration substantially that of the patterned adhesion portion.

26. The method of claim 25, wherein the temperature is between about 650°C and about 1100°C.

27. The method of claim 25, wherein the annealing occurs in an atmosphere comprising a compound selected from the group consisting of oxygen, ozone, nitrogen, argon, NO_x, SO_3, N_2O, and a combination thereof.

28. The method of claim 25 wherein annealing the substrate assembly is selected from the group consisting of an RTO anneal or an RTN anneal.

29. The method of claim 25, wherein the at least one metal-containing adhesion region comprises a material selected from the group consisting of titanium, tantalum, tungsten, rhodium, iridium, cobalt, and nitrides, oxides, and silicides thereof.

30. The method of claim 25 wherein the at least one metal-containing adhesion region comprises titanium nitride.

31. The method of claim 25, wherein the substrate assembly also has a surface comprising a material selected from the group consisting of silicon, silicon dioxide, BPSG, PSG, Al_2O_3, and a combination thereof.

32. The method of claim 25 wherein removing unadhered platinum comprises rinsing the substrate assembly in a rinsing composition for a period of time of about 5 minutes or less.

33. The method of claim 32 wherein the rinsing composition is selected from the group consisting of water, aqua regia, hydrofluoric acid, hydrochloric acid, hydrogen peroxide, and a combination thereof.

34. A method for use in forming a capacitor, the method comprising:

providing a substrate assembly, the substrate assembly including at least one surface; and

forming an electrode on the at least one surface of the substrate assembly, wherein forming the electrode comprises at least forming a platinum electrode layer, wherein forming the platinum electrode layer includes:

forming a metal-containing adhesion layer on the at least one surface, and

forming the platinum layer only on the metal-containing adhesion layer.

35. The method of claim 34 wherein forming the platinum electrode layer comprises:

forming a layer of platinum on the at least one surface of the substrate assembly and the metal-containing adhesion layer;

annealing the substrate assembly; and

removing platinum on the at least one surface of the substrate assembly such that the platinum layer is formed only on the metal-containing adhesion layer.

36. The method of claim 34, wherein the substrate assembly includes an opening defined therein, wherein the opening is defined by a bottom surface of the substrate assembly and at least one side wall extending therefrom and further wherein the metal-containing adhesion layer is formed on the surfaces defining the opening.

37. The method of claim 34, wherein the platinum layer has thickness of about 600 Å or less.

38. The method of claim 34, wherein the platinum layer has a thickness of about 500 Å or less.

39. The method of claim 35, wherein annealing the substrate assembly is at a temperature the temperature is between about 650°C and about 1100°C.

40. The method of claim 35, wherein the annealing occurs in an atmosphere comprising a compound selected from the group consisting of oxygen, ozone, nitrogen, argon, NO_x, SO_3, N_2O, and a combination thereof.

41. The method of claim 35 wherein annealing the substrate assembly is selected from the group consisting of an RTO anneal or an RTN anneal.

42. The method of claim 34, wherein the metal-containing adhesion layer comprises a material selected from the group consisting of titanium, tantalum, tungsten, rhodium, iridium, cobalt, and nitrides, oxides, and silicides thereof.

43. The method of claim 34 wherein the metal-containing adhesion layer comprises titanium nitride.

44. The method of claim 34, wherein the surface of the substrate assembly comprises a material selected from the group consisting of silicon, silicon dioxide, BPSG, PSG, Al_2O_3, and a combination thereof.

45. A method for forming a discontinuous conductive layer in the fabrication of integrated circuits, the method comprising:

providing a substrate assembly in a reaction chamber, the substrate assembly having a surface including at least one metal-containing adhesion region separated by at least one surface region of the substrate assembly;

forming a conductive metal layer on the surface of the substrate assembly, wherein the conductive metal layer comprises a metal different from a metal in the least one metal-containing adhesion region;

annealing the substrate assembly including the conductive metal layer thereon; and

removing conductive material metal from the at least one exposed surface region to form a discontinuous conductive metal layer on at least one metal-containing adhesion region.

46. The method of claim 45, wherein forming the platinum comprises forming a platinum layer having thickness of about 600 Å or less.

47. The method of claim 46, wherein forming the platinum comprises forming a platinum layer having a thickness of about 500 Å or less.

48. The method of claim 45, wherein annealing the substrate assembly is at a temperature less than the melting point of the at least one exposed surface region.

49. The method of claim 48, wherein annealing the substrate assembly comprises exposing the substrate assembly to a temperature less than the melting point of the at least one surface region for a time period sufficient to cause pooling of the platinum on the insulating portion of the at least one surface region.

50. The method of claim 49, wherein the temperature is between about 650°C and about 1100°C.

51. The method of claim 49, wherein the period of time is between 5 seconds and about 5 minutes.

52. The method of claim 49, wherein the annealing occurs in an atmosphere comprising a compound selected from the group consisting of oxygen, ozone, nitrogen, argon, NO_x, SO_3, N_2O, and a combination thereof.

53. The method of claim 45 wherein annealing the substrate assembly is selected from the group consisting of an RTO anneal or an RTN anneal.

54. The method of claim 45, wherein the at least one metal-containing adhesion region comprises a material selected from the group consisting of titanium, tantalum, tungsten, rhodium, iridium, cobalt, and nitrides, oxides, and silicides thereof.

55. The method of claim 45 wherein the at least one metal-containing adhesion region comprises titanium nitride.

56. The method of claim 45, wherein the at least one exposed surface region comprises a material selected from the group consisting of silicon, silicon dioxide, BPSG, PSG, Al_2O_3, and a combination thereof.

57. The method of claim 45, wherein the conductive metal layer comprises a metal selected from the group consisting of platinum or ruthenium.

58. A method for patterning a platinum layer in the fabrication of integrated circuits, the method comprising:

providing a substrate assembly including a surface;

forming a patterned metal-containing adhesion layer on the surface, resulting in at least one exposed surface region of the substrate assembly;

forming platinum on the patterned metal-containing adhesion layer and the at least one exposed surface region of the substrate assembly;

annealing the substrate assembly including the patterned metal-containing adhesion layer and the platinum thereon; and

removing at least a portion of the platinum from the at least one exposed surface region of the substrate assembly resulting in a patterned platinum layer, wherein annealing the substrate assembly and removing the portion of the platinum from the at least one exposed surface region is performed prior to forming any other materials on the platinum.

59. The method of claim 58, wherein forming the platinum comprises forming the platinum layer having a thickness of about 600 Å or less.

60. The method of claim 59, wherein forming the platinum comprises forming the platinum layer having a thickness of about 500 Å or less.

61. The method of claim 58, wherein annealing the substrate assembly comprises annealing the substrate assembly at a temperature less than the melting point of the at least one exposed surface region.

62. The method of claim 58, wherein annealing the substrate assembly comprises performing a rapid thermal anneal in an atmosphere of at least one of oxygen and nitrogen.

63. The method of claim 58, wherein the patterned metal-containing adhesion layer comprises at least one material selected from the group consisting of titanium, tantalum, tungsten, rhodium, iridium, cobalt, and nitrides, oxides, and silicides thereof.

64. The method of claim 58, wherein the patterned metal-containing adhesion layer comprises titanium nitride.

65. The method of claim 58, wherein the at least one exposed surface region comprises at least one material selected from the group consisting of silicon, silicon dioxide, BPSG, PSG, Al_2O_3, and combinations thereof.

66. A method for forming a discontinuous conductive layer in the fabrication of integrated circuits, the method comprising:

providing a substrate assembly comprising a surface having at least one metal-containing adhesion region and at least one surface region;

forming a platinum layer on the surface of the substrate assembly;

annealing the substrate assembly including the platinum layer formed thereon; and

removing at least a portion of the platinum layer from the at least one surface region resulting in a discontinuous platinum layer on the at least one metal-containing adhesion region, wherein annealing the substrate assembly and removing the portion of the platinum layer from the at least one surface region is performed prior to forming any other materials on the platinum layer.

67. The method of claim 66, wherein forming the platinum layer comprises forming the platinum layer having a thickness of about 600 Å or less.

68. The method of claim 67, wherein forming the platinum layer comprises forming the platinum layer having a thickness of about 500 Å or less.

69. The method of claim 66, wherein annealing the substrate assembly comprises annealing the substrate assembly at a temperature less than the melting point of the at least one surface region.

70. The method of claim 66, wherein annealing the substrate assembly comprises performing a rapid thermal anneal in an atmosphere of at least one of oxygen and nitrogen.

71. The method of claim 66, wherein the at least one metal-containing adhesion region comprises at least one material selected from the group consisting of titanium, tantalum, tungsten, rhodium, iridium, cobalt, and nitrides, oxides, and silicides thereof.

72. The method of claim 66, wherein the at least one metal-containing adhesion region comprises titanium nitride.

73. The method of claim 66, wherein the at least one surface region comprises at least one material selected from the group consisting of silicon, silicon dioxide, BPSG, PSG, Al_2O_3, and a combination thereof.

74. A method for forming a patterned platinum layer in the fabrication of integrated circuits, the method comprising:

providing a substrate assembly including a surface having a patterned metal-containing adhesion portion thereon;

depositing a platinum layer on the surface of the substrate assembly and the patterned metal-containing adhesion portion, wherein the platinum layer has a thickness of about 600 Å or less;

annealing the substrate assembly at a temperature of about 1100°C or less; and

removing unadhered platinum from at least a portion of the surface of the substrate assembly such that a resulting patterned platinum layer has a configuration substantially that of the patterned metal-containing adhesion portion, wherein annealing the substrate assembly and

removing unadhered platinum from the portion of the surface of the substrate assembly is performed prior to forming any other materials on the platinum layer.

75. The method of claim 74, wherein the temperature is between about 650°C and about 1100°C.

76. The method of claim 74, wherein annealing the substrate assembly occurs in an atmosphere comprising at least one compound selected from the group consisting of oxygen, ozone, nitrogen, argon, NO_x, SO_3, N_2O, and combinations thereof.

77. The method of claim 74, wherein annealing the substrate assembly comprises performing a rapid thermal anneal in an atmosphere of at least one of oxygen and nitrogen.

78. The method of claim 74, wherein the at least one patterned metal-containing adhesion portion comprises at least one material selected from the group consisting of titanium, tantalum, tungsten, rhodium, iridium, cobalt, and nitrides, oxides, and silicides thereof.

79. The method of claim 74, wherein the at least one patterned metal-containing adhesion portion comprises titanium nitride.

80. The method of claim 74, wherein the surface of the substrate assembly comprises at least one material selected from the group consisting of silicon, silicon dioxide, BPSG, PSG, Al_2O_3, and combinations thereof.

81. The method of claim 74, wherein removing unadhered platinum comprises rinsing the substrate assembly in a rinsing composition for a period of time of about 5 minutes or less.

82. The method of claim 81, wherein the rinsing composition comprises at least one composition selected from the group consisting of water, aqua regia, hydrofluoric acid, hydrochloric acid, hydrogen peroxide, and combinations thereof.

83. A method for use in forming a capacitor, the method comprising:

providing a substrate assembly, the substrate assembly including at least one surface; and

forming an electrode on the at least one surface of the substrate assembly, wherein forming the electrode comprises at least forming a platinum electrode layer, wherein forming the platinum electrode layer comprises:

forming a discontinuous metal-containing adhesion layer on the at least one surface;

forming a platinum layer on at least portions of the at least one surface of the substrate assembly and the discontinuous metal-containing adhesion layer;

annealing the substrate assembly; and

removing at least a portion of the platinum layer from the at least one surface of the substrate assembly resulting in a discontinuous platinum layer, wherein annealing the substrate assembly and removing the at least a portion of the platinum layer from the at least one surface of the substrate assembly is performed prior to forming any other materials on the platinum.

84. The method of claim 83, wherein the substrate assembly includes an opening defined therein, wherein the opening is defined by a bottom surface of the substrate assembly and at least one side wall surface extending therefrom and further wherein the discontinuous metal-containing adhesion layer is formed on the surfaces defining the opening.

85. The method of claim 83, wherein the platinum layer has a thickness of about 600 Å or less.

86. The method of claim 85, wherein the platinum layer has a thickness of about 500 Å or less.

87. The method of claim 83, wherein annealing the substrate assembly comprises annealing the substrate assembly at a temperature between about 650°C and about 1100°C.

88. The method of claim 83, wherein annealing the substrate assembly occurs in an atmosphere comprising at least one compound selected from the group consisting of oxygen, ozone, nitrogen, argon, NO_x, SO_3, N_2O, and combinations thereof.

89. The method of claim 83, wherein annealing the substrate assembly comprises performing a rapid thermal anneal in an atmosphere of at least one of oxygen and nitrogen.

90. The method of claim 83, wherein the discontinuous metal-containing adhesion layer comprises at least one material selected from the group consisting of titanium, tantalum, tungsten, rhodium, iridium, cobalt, and nitrides, oxides, and silicides thereof.

91. The method of claim 83, wherein the discontinuous metal-containing adhesion layer comprises titanium nitride.

92. The method of claim 83, wherein the at least one surface of the substrate assembly comprises at least one material selected from the group consisting of silicon, silicon dioxide, BPSG, PSG, Al_2O_3, and a combination thereof.

93. A method for forming a discontinuous conductive layer in the fabrication of integrated circuits, the method comprising:

providing a substrate assembly having a surface comprising at least one metal-containing adhesion region and at least one surface region;

forming a conductive metal layer on the surface of the substrate assembly, wherein the conductive metal layer comprises a metal different from a metal in the at least one metal-containing adhesion region;

annealing the substrate assembly including the conductive metal layer; and

removing at least a portion of the conductive metal layer from the at least one surface region resulting in a discontinuous conductive metal layer on the at least one metal-containing adhesion region, wherein annealing the substrate assembly and removing the at least a portion of the conductive metal layer from the at least one surface region is performed prior to forming any other materials on the conductive metal layer.

94. The method of claim 93, wherein forming the conductive metal layer comprises forming the conductive metal layer having a thickness of about 600 Å or less.

95. The method of claim 94, wherein forming the conductive metal layer comprises forming the conductive metal layer having a thickness of about 500 Å or less.

96. The method of claim 93, wherein annealing the substrate assembly comprises annealing the substrate assembly at a temperature less than the melting point of the at least one surface region.

97. The method of claim 93, wherein annealing the substrate assembly comprises performing a rapid thermal anneal in an atmosphere of at least one of oxygen and nitrogen.

98. The method of claim 93, wherein the at least one metal-containing adhesion region comprises at least one material selected from the group consisting of titanium, tantalum, tungsten, rhodium, iridium, cobalt, and nitrides, oxides, and silicides thereof.

99. The method of claim 93, wherein the at least one metal-containing adhesion region comprises titanium nitride.

100. The method of claim 93, wherein the at least one surface region comprises at least one material selected from the group consisting of silicon, silicon dioxide, BPSG, PSG, and Al_2O_3.

101. The method of claim 93, wherein the conductive metal layer comprises at least one metal selected from the group consisting of platinum or ruthenium.

102. A method for patterning a platinum layer in the fabrication of integrated circuits, the method comprising:

providing a substrate assembly including a surface;

forming a titanium nitride layer on the surface of the substrate assembly;

patterning the titanium nitride layer to form a patterned titanium nitride adhesion layer on the surface, wherein patterning the titanium nitride layer results in at least one exposed surface region of the substrate assembly;

depositing a material comprising platinum on the patterned titanium nitride adhesion layer and the at least one exposed surface region of the substrate assembly;

annealing the substrate assembly including the patterned titanium nitride adhesion layer and the material comprising platinum; and

removing at least a portion of the material comprising platinum from the at least one exposed surface region of the substrate assembly resulting in a patterned platinum layer.

103. The method of claim 102, wherein depositing the material comprising platinum comprises depositing a platinum layer having a thickness of about 600 Å or less.

104. The method of claim 102, wherein depositing the material comprising platinum comprises depositing a platinum layer using a chemical vapor deposition process.

105. The method of claim 102, wherein depositing the material comprising platinum comprises depositing a platinum layer consisting essentially of platinum.